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The Arachnid Order Solpugida in the United States, Supplement 1

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Since the publication of "The arachnid order Solpugida in the United States" (Muma, 1951), several hundred solpugids have been sent to me for identification. The largest collections have been from the American Museum of Natural History and the University of California. I have appreciated this opportunity to study additional material and extend thanks to these institutions and the curators in charge of the arachnid collections.

Twenty of the new species described below have affinities with previously described genera. A few are sufficiently atypical to extend generic descriptions and require the description of new species groups. A new genus is described for a distinctive new species. The collections also contained many new distributional records, the most interesting of which are included here. Several unusual specimens of previously described species are also discussed and recorded.

The systematic arrangement of the species described and discussed here is the same as that used in Muma, 1951, to facilitate cross reference when this paper is used as a supplement to the review. Similar form and style have been used for the same reason.

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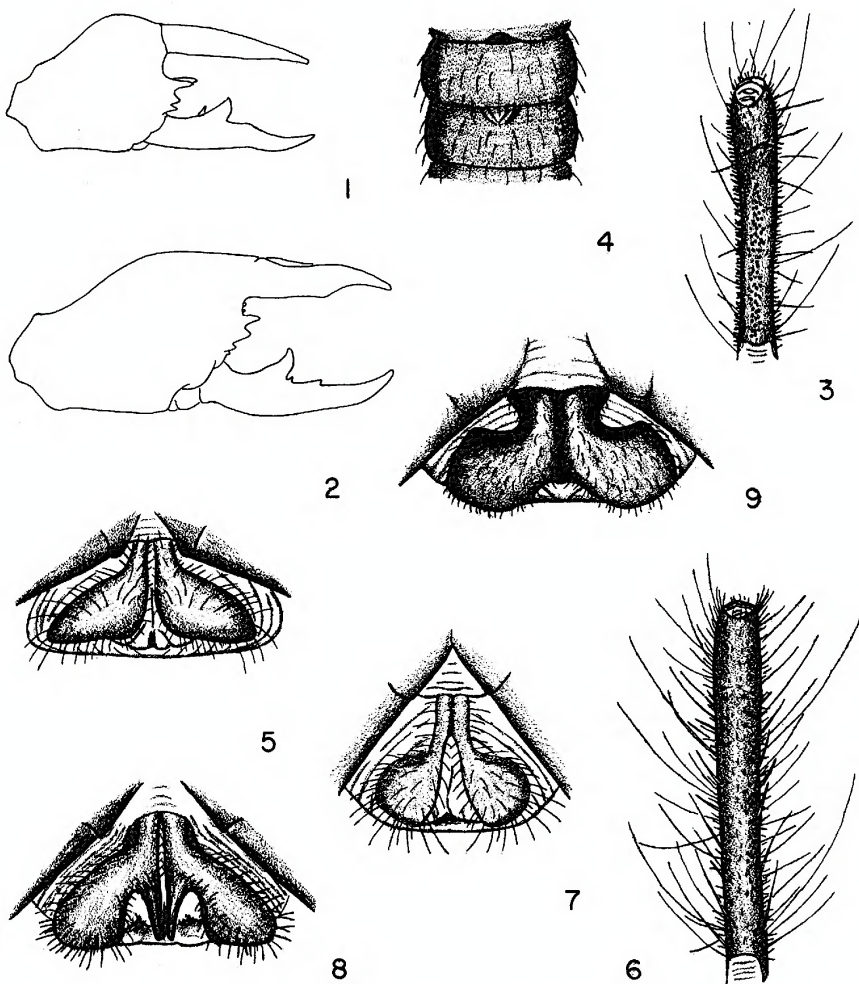


FIG. 1. *Eremorhax magnus* (Hancock), variation of chelicera.

FIGS. 2-4. *Eremobates nanus*, new species. 2. Ectal view of right male chelicera. 3. Mesoventral view of apical segments of right male palpus. 4. Male abdominal ctenidia.

FIG. 5. *Eremothera sculpturata* Muma, ventral view of genital opercula of female from Yuma, Arizona.

FIGS. 6, 7. *Therobates coloradensis*, new species. 6. Mesoventral view of apical segments of right female palpus. 7. Ventral view of female genital opercula.

FIG. 8. *Therobates acrilobatus*, new species, ventral view of female genital opercula.

FIG. 9. *Therobates arcus*, new species, ventral view of female genital opercula.

FAMILY EREMOBATIDAE ROEWER
SUBFAMILY EREMOBATINAE ROEWER
GENUS *EREMORHAX* ROEWER

Eremorhax magnus (HANCOCK)

Figure 1

Datames magna HANCOCK, 1888, Proc. Amer. Phil. Soc., vol. 25, p. 107, figs. A, B, a-h (male).

Eremorhax magnus, ROEWER, 1934, in Bronn, Klassen und Ordnungen des Tierreich, vol. 5, div. 4, book 4, p. 553, figs. 319, 324a (male and female).

Eremorhax magnus, MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 43, figs. 18-22 (male and female).

REMARKS: A previously recorded small male, reexamined for morphological differences, has only a slightly more distinct mesial groove of the fixed finger. The measurement of the specimen proved it to be smaller than the smallest size recorded for the species, 22.0 mm. in total length, including the chelicerae. It was collected in the Sandia Mountains, New Mexico, on May 28, 1948, by C. J. Gillespie. A second slightly larger specimen, also with a more distinct mesial groove, was collected at El Paso, Texas, May 29, 1952. A variation of the chelicerae discussed in Muma (1951) is illustrated in figure 1.

GENUS *EREMOBATES* BANKS

Scaber GROUP

Eremobates ctenidiellus Muma

Eremobates ctenidiellus MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 57, figs. 58-60 (male and female).

RECORDS: Washington: Spearfish, Klickitat Country, June, 1954, one male (R. Crabtree). Nevada: Mercury, June 30, 1960, one female (Elden Beck).

REMARKS: This species is now known from California, Oregon, Washington, and Utah.

Eremobates ascopulatus Muma

Eremobates ascopulatus MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 60, fig. 69 (male).

RECORDS: Idaho: Parma, August, 1950, one male.

REMARKS: This species was previously known only from the holotype taken at Richfield, Utah.

Eremobates similis Muma

Eremobates similis MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 60, figs. 70, 71 (male).

RECORDS: Arizona: Jacob Lake, June 18, 1958, one male (W. J. Gertsch). Nevada: Mercury, June 30, 1960, one male (Elden Beck).

Palpisetulosus GROUP***Eremobates nanus***, new species

Figures 2-4

DIAGNOSIS: This species runs to the *E. tuberculatus* (Kraepelin)-*E. purpusi* (Roewer) couplet in the key to males in Muma (1951, p. 60). It is readily distinguished by the number of abdominal ctenidia (four) and the cheliceral profile.

MALE HOLOTYPE: Total length, 17.0 mm.

	LENGTH	WIDTH
Chelicerae	4.6 mm.	2.0 mm.
Propeltidium	2.5	3.5
Palpi	13.0	—
First legs	10.0	—
Fourth legs	17.5	—

Color and markings in alcohol similar to those of *E. scopulatus* Muma except markings on femora and tibiae of legs and palpi dark and distinct and metatarsi and tarsi of palpi faintly dusky.

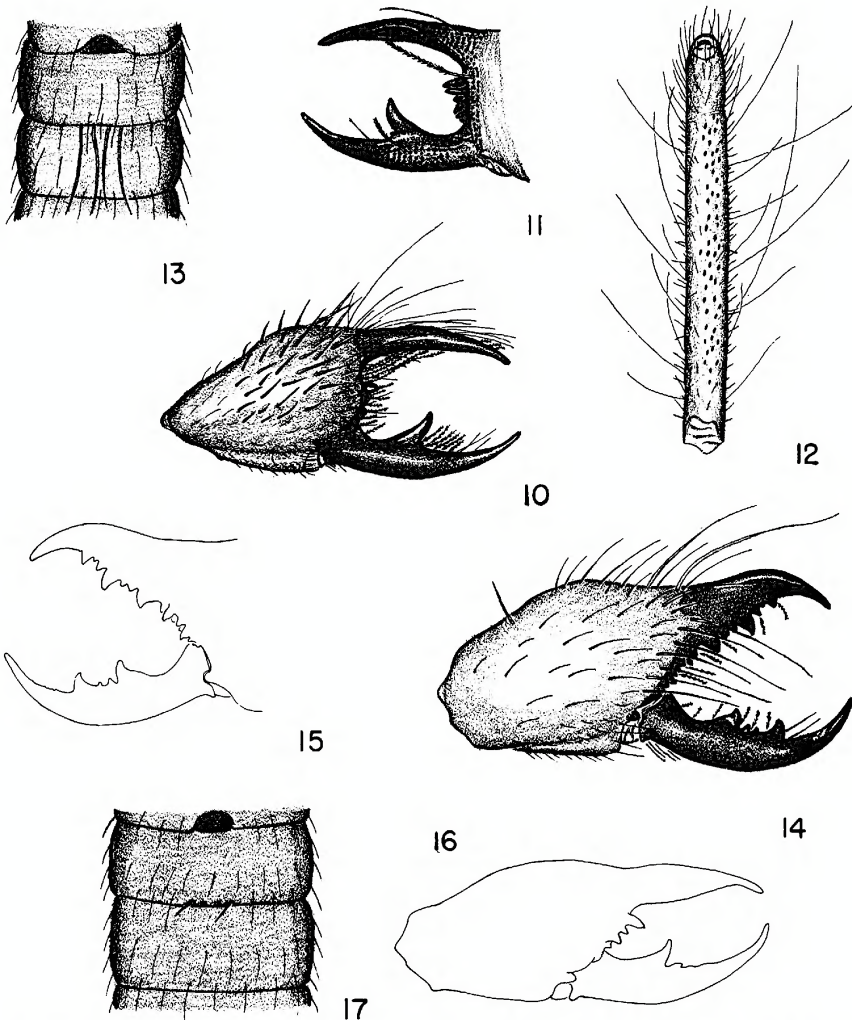
Structure similar to that of *E. scopulatus* except no mesial tooth on movable finger of chelicerae, process on fixed finger is a rounded lobe that is nearly indistinguishable from a lateral view, and fixed finger is undulate along ventral surface (fig. 2), there is a scopula of about 80 papillae on basal two-thirds of metatarsus of palpus (fig. 3), and there are five short, sublinear ctenidia on first post-spiracular abdominal sternite (fig. 4). One ctenidium appears to be spurious.

TYPE LOCALITY: Male holotype from Riverton in Eldorado County, California, July 11, 1952 (W. J. Gertsch), in the American Museum of Natural History.

Eremobates nodularis Muma

Figures 56, 57

Eremobates nodularis MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 69, figs. 95, 96 (male).



FIGS. 10-15. *Therobates arcus*, new species. 10. Ectal view of right male chelicera. 11. Mesial view of fixed finger of right male chelicera. 12. Mesoventral view of right male palpus. 13. Male abdominal ctenidia. 14. Ectal view of right female chelicera. 15. Mesial view of right female chelicera.

FIGS. 16, 17. *Therobates macswaini*, new species. 16. Ectal view of right male chelicera. 17. Male abdominal ctenidia.

DIAGNOSIS: Males are readily distinguished from *E. guenini* (Roewer) by a narrow fondal notch and the presence of two abdominal ctenidia. Females have two trace ctenidia on first post-spiracular abdominal sternite, one intermediate tooth on front edge of the principal tooth of

both the movable and immovable fingers, and distinctive opercula.

FEMALES: Total length, 19.0 to 28.0 mm.

	LENGTH	WIDTH
Chelicerae	5.4– 7.1 mm.	2.4–3.1 mm.
Propeltidium	1.2– 3.5	2.1–5.3
Palpi	11.0–14.0	—
First legs	10.0–13.0	—
Fourth legs	16.0–20.0	—

Allotype larger.

Color and markings in alcohol similar to those of male, with peltidial and abdominal markings darker.

Structure similar to *E. palpisetulosus* Fichter except that one intermediate tooth on both cheliceral fingers occurs on the anterior margin of the principal tooth. The dentition of the allotype is worn so that of the accompanying paratype is shown in figure 56.

Two trace ctenidia occur on the first post-spiracular abdominal sternite.

The opercula are similar to but distinct from those of *E. mormonus* (Roewer). (See fig. 57.)

TYPE LOCALITY: Male holotype from Carlsbad, New Mexico, July 26, 1938 (Bjorkman), in the American Museum of Natural History. Female allotype, female paratype, and two males from Portal, Cochise County, Arizona, August, 1960 (Zweifel), also in the American Museum of Natural History.

Angustus GROUP

Eremobatus angustus Muma

Eremobatus angustus MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 80, figs. 127–133 (male and female).

RECORDS: Texas, Terrell County, 13 miles south of Sheffield on Stockton Plateau (W. W. Milstead).

REMARKS: This is the second Texas record for the species.

GENUS *EREMOTHERA* MUMA

Eremothera sculpturata Muma

Figure 5

Eremothera sculpturata MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 82, figs. 134–138 (male).

RECORDS: Arizona: Carr Canyon, Huachuca Mountains, June 3, 1953, one female (Cazier and Gertsch); Yuma, North Yuma Valley, August 14, 1957, one male (Louie Arviso); Yuma, September 14, 1956, one female (V. Roth), August 30, 1957, one female (V. Roth); Yuma County, Little Horn Mountains, one young female.

REMARKS: The female of this species has not been described, but rather than confuse the literature with possible synonyms I record the above specimens here, pending the collection of associated males and females of this genus. The epigynum of the Yuma, August 30, 1957, specimen is shown in figure 5. This species has been recorded only from Arizona.

HORRIBATES, NEW GENUS

Although no comparative diagnosis of this genus can be made in the absence of males, there can be no question concerning the unique generic status of the generotype described below. The long slender chelicerae, the extremely short palpal tarsus, and the unusual spination of the palpus are distinctive within the Eremobatidae.

Only one tiny aborted tarsal claw could be found on the first leg, so the genus is tentatively placed in the Eremobatinae.

GENEROTYPE: *Horribates spinigerus*, new species.

Horribates spinigerus, new species

Figures 58-62

DIAGNOSIS: This species is easily distinguished by the ventral armature of the palpus. Except for two mesolateral rows of long heavy spines borne on tubercles, only a few widely scattered fine setae occur on the ventral surface of the palpus.

FEMALE HOLOTYPE: Total length, 21.0 mm.

	LENGTH	WIDTH
Chelicerae	4.9 mm.	1.7 mm.
Propeltidium	2.3	3.3
Palpi	18.5	—
First legs	13.0	—
Fourth legs	24.0	—

Color in alcohol pale yellow except for dusky purplish markings as follows: eye tubercle dark; propeltidium mottled except for a pale median stripe, distinct dark margins, pale ectal angles of anterior arc, and a pair of pale ovate spots on caudo-ectal third; mesopeltidium and metapeltidium dusky except for a pair of central, pale, ovate areas. Malleoli white.

Dentition of chelicerae as shown in figures 58 and 59. Movable finger with a large principal tooth, a large, acute anterior tooth, two intermediate teeth that are nearly one-half as large as the anterior tooth, an uneven serration in front of anterior tooth, and no mesial tooth. Fixed finger with a large principal tooth, a medial tooth slightly larger than principal tooth, an anterior tooth slightly smaller than principal tooth, two intermediate teeth between principal and medial teeth, and one behind principal tooth and between medial and anterior teeth; intermediate teeth unusually large and acute. Fondal teeth graded II, I, III, IV in ectal series and I, III, II, IV in mesial series.

Eye tubercle situated on anterior margin of propeltidium, with eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Femur, tibia, metatarsus, and tarsus of palpus provided below with a few widely scattered fine setae and a double row of robust movable spines borne on tubercles in modified sockets, one pair on tarsus, seven pairs on metatarsus, nine pairs on tibia, and seven pairs on femur; there is also an occasional ectal spine (figs. 60 and 61). Upper surface of palpi provided with usual scattered cylinder bristles and long, slender setae. Metatarsus of palpus nearly 4.5 times as long as tarsus.

There are no distinct ctenidia on the first post-spiracular abdominal sternite.

Opercula distinctive (fig. 62).

TYPE LOCALITY: Female holotype from 2 miles east of Anza, Borrego State Park, San Diego County, California on April 22, 1960 (W. J. Gertsch), in the American Museum of Natural History.

SUBFAMILY THEROBATINAE MUMA

The key below is a revision of that on page 85 in Muma (1951), to include the new *arcus* group, *andreasana* group, and *striodorsalis* group, described below.

KEY TO GROUPS

MALES

1. Apical plumose bristle of flagellum complex conspicuously enlarged and flattened. 2
- Apical plumose bristle of flagellum complex not conspicuously enlarged and flattened. 4
2. Groove of fixed finger mesoventral in position. 3
- Groove of fixed finger dorsal to dorsomesial in position. *striodorsalis* group
3. Mesoventral groove composed of weak ridges and hollows; movable finger modified apically. *andreasana* group
- Mesoventral groove a distinct hollow cup; movable finger not modified apically. *branchi* group

4. Mesoventral groove distinct; movable finger not modified apically.....5
 Mesoventral groove indistinct; movable finger modified apically.....
*imperialis* group
5. Mesoventral groove a narrow slot without distinct carinae.....*arcus* group
 Mesoventral groove a wide hollow cup with distinct carinae...*bilobatus* group

GENUS *THEROBATES* MUMA

Therobates branchi Muma

Therobates branchi MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 85, figs. 142–150 (male and female).

RECORDS: Arizona: Fredonia, July 23, 1952, two males (Cazier, Gertsch, Schrammel). California: Olancha, Inyo County, July 18, 1952, one female (Cazier, Gertsch, Schrammel).

REMARKS: The species is now known from California, Arizona, and Nevada.

Therobates malkini MUMA

Therobates malkini MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 88, fig. 153 (female).

RECORDS: California: Andreas Canyon, Riverside County, April 24, 1954, one female (M. Wasbauer). Utah: Cedar City, September 19, 1956, one female (G. F. Knowlton, W. J. Sjoblom).

REMARKS: This species was previously known only from the holotype.

***Therobates coloradensis*, new species**

Figures 6, 7

DIAGNOSIS: This species seems to be most closely related to *T. malkini*, from which it differs in having a palpal scopula.

FEMALE HOLOTYPE: Total length, 22.0 mm.

	LENGTH	WIDTH
Chelicerae	7.2 mm.	2.6 mm.
Propeltidium	2.8	4.7
Palpi	18.5	—
First legs	13.5	—
Fourth legs	23.5	—

Color in alcohol light rusty yellow, with dusky purplish markings similar to those on *T. malkini*.

Dentition and structure similar to those of *T. branchi* Muma except there is a tiny supernumerary tooth just behind anterior tooth on fixed finger of chelicerae, there are six trace ctenidia on first post-spiracular abdominal sternite, there are about 20 widely spaced papillae in a thin scopula on metatarsus of palpi (fig. 6), and opercula of genital segment differ (fig. 7).

TYPE LOCALITY: Female holotype from Grand Canyon, Arizona, July 2, 1956, in the American Museum of Natural History.

Therobates cameronensis Muma

Therobates cameronensis MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 90, figs. 157–161 (male).

RECORDS: California: Furnace Creek, April 1, 1951, one male (P. D. Hurd). Nevada: Mercury, May 18, 1960, one male; July 13, 1960, one male, both collected by Elden Beck.

REMARKS: This is the fifth record for the species. It possesses four ctenidia, not six as stated in Muma (1951, p. 90).

Bilobatus GROUP

In the species described below, the fondal tooth formulas differ from the formula for *T. bilobatus* Muma and are variable between species and specimens, indicating instability of the character.

***Therobates acrilobatus*, new species**

Figure 8

DIAGNOSIS: This species is related to *T. bilobatus* but is easily distinguished by the different dentition and genital opercula.

FEMALE HOLOTYPE: Total length, 16.0 mm.

	LENGTH	WIDTH
Chelicerae	4.5 mm.	1.7 mm.
Propeltidium	2.0	3.0
Palpi	13.0	—
First legs	10.0	—
Fourth legs	16.0	—

Color in alcohol very similar to that of light examples of *T. bilobatus*. Markings on chelicerae and propeltidium very faint, almost indistinguishable. Those on palpi and legs light but distinct.

Dentition of chelicerae considerably worn but similar to that of *T.*

bilobatus except there is a serration in front of anterior tooth of movable finger, two intermediate teeth between medial and anterior teeth of fixed finger, and both rows of fondal teeth graded I, III, II, IV in size.

Structure similar to *T. bilobatus* except there are no distinguishable ctenidia on first post-spiracular abdominal segment.

Opercula of genital segment as shown in figure 8.

TYPE LOCALITY: Female holotype from Quail Springs, Joshua Tree National Monument, California, April 12, 1950 (W. F. Barr), in the American Museum of Natural History.

***Therobates plicatus*, new species**

Figures 63–67

DIAGNOSIS: Males readily identified by folded tip of fixed cheliceral finger and narrow, curved, fondal notch. Females easily confused with females of *Hemerotrecha serrata* Muma but have distinctive opercula and no mesial tooth on movable finger. The different fondal tooth formula of the females is unique.

MALES: Total length, 18.0 to 19.0 mm.

	LENGTH	WIDTH
Chelicerae	4.4– 4.6 mm.	2.1–2.0 mm.
Propeltidium	2.1– 2.2	3.3–3.2
Palpus	22.0–23.0	—
First legs	13.0–13.0	—
Fourth legs	26.0–26.0	—

Holotype smaller.

Color in alcohol pale yellow, with dusky purplish markings as follows: eye tubercle dark, propeltidium dusky except for a narrow pale stripe and a dark anterior margin; mesopeltidium, metapeltidium, and abdominal tergites dusky, with posterior tergites nearly yellow; palpi and legs dusky except on tarsi, coxae, trochanters, and basal ends of femora; malleoli white.

Dentition of chelicerae as in figures 63 and 64. Movable finger slender, strongly curved, with a large principal tooth, anterior teeth and one intermediate tooth reduced to minute denticules, and no mesial tooth. Fondal teeth distinct from dentate socket margin, with both rows graded I, III, II, IV in size; supernumerary denticules often occurring between fondal teeth. Fondal notch twice as deep as wide and curved dorsally at its mesial end. Fixed finger curved dorsally at base, straight in middle of length and folded downward at tip; in dorsal view narrowed mesially in distal half.

Groove of fixed finger a deep, dorsally hooded, mesially rounded concavity on distal half of finger. Flagellum complex typical of group, with dorsal tubular bristles curved downward at tips, plumose bristles curved upward, and basal tubular bristles straight or gently curved upward. Mesial setae of movable finger plumose except for five or six at distal end of articulation area.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by less than one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Metatarsus and tibia of palpus provided below with a narrow, line-like scopula of 10–20 papillae and long, heavy, cylinder bristles (fig. 65). Above, these segments clothed with short, fine, cylinder bristles. Metatarsus four times as long as tarsus.

First post-spiracular abdominal sternite without ctenidia.

FEMALES: Total length, 21.5 to 22.0 mm.

	LENGTH	WIDTH
Chelicerae	5.0– 5.7 mm.	1.8–2.1 mm.
Propeltidium	2.3– 2.4	3.4–3.8
Palpi	19.0–21.0	—
First legs	12.0–13.0	—
Fourth legs	24.5–27.5	—

Allotype smaller.

Color and markings in alcohol same as in male.

Dentition of chelicerae apparently quite variable but in general as shown in figure 66 of paratype. Movable finger with large principal tooth, smaller anterior tooth, two intermediate teeth, basal of which is much larger, and no mesial tooth. Fixed finger with principal, medial and anterior teeth large, medial tooth larger than principal tooth, two intermediate teeth between principal and medial and between medial and anterior teeth, and one intermediate tooth behind principal tooth. Fondal teeth of mesial row as in male, those of ectal row graded III, II, IV, I in size.

Structure otherwise same as in male except no scopula on metatarsus of palpus.

Opercula of genital segment as shown in figure 67.

TYPE LOCALITY: Male holotype from Mercury, Nevada, on July 15, 1960, by Elden Beck. Female allotype from Mercury, Nevada, on July 6, 1960, by Elden Beck. Male paratypes from the same locality by the same collector on July 19, 1960, and July 21, 1960. Female paratype from the same locality by the same collector on July 25, 1960. All types in the American Museum of Natural History.

Therobates arcellus, new species

Figures 68-71

DIAGNOSIS: Males of this dainty species are readily distinguished by the pair of long, blade-like ctenidia and comparatively shallow mesial groove of the fixed finger. Females possess distinctive opercula. The opercula of *Hemerotrecha nevadensis* Muma are quite similar to those of this species, and it may, when males have been collected, prove to belong in this genus and group.

MALE HOLOTYPE: Total length, 9.0 mm.

	LENGTH	WIDTH
Chelicerae	2.3 mm.	0.8 mm.
Propeltidium	1.4	1.8
Palpi	11.0	—
First legs	8.5	—
Fourth legs	14.0	—

Color in alcohol off-white to pale yellow, with dusky purplish markings as follows: chelicerae with one dorsal and two lateral stripes on ectal face, mesial face faintly dusky; propeltidium dark except for a median pale stripe about as wide as black eye tubercle and a pale marginal band; mesopeltidium and metapeltidium unmarked; abdominal tergites unmarked or at most faintly dusky; palpus dusky on dorsal and lateral faces of tarsus, metatarsus, tibia, and apical three-fourths of femur; legs dusky on ectal trochanters, femora, tibiae, and metatarsi, with color distinctly darker at union of femora and tibiae and of tibiae and metatarsi. Malleoli white, finely margined with brown.

Dentition of chelicerae as shown in figures 68 and 69. Movable finger with a large principal tooth but no recognizable intermediate, anterior, or mesial tooth; bearing a wide, shallow, ventral notch on distal half of its length. Fondal notch broadly C-shaped, sloped dorsally at its inner end and containing a tiny denticule. Fondal tooth formulas different on each chelicera, the right I, III, II, IV ectally and I, III, IV, II mesially, the left I, III, II, IV ectally and I, II, IV, III mesially. Such variation is probably atypical. Fixed finger sinuate, narrowed at base and curved downward at tip in lateral view; from dorsal view tapering to a point on distal half.

Groove of fixed finger a wide, shallow concavity, bordered dorsally with a thin, blade-like ridge not extending basally to level of first fondal tooth. Flagellum complex typical of group, with all bristles straight or lightly curved downward. Mesial setae of movable finger apparently all smooth.

Eye tubercle large in proportion to propeltidium and located on anterior margin. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.3.

Femur, tibia, metatarsus, and tarsus of palpus provided with long, slender spines and scattered cylinder bristles below as in *T. bilobatus* but no scopula on metatarsus. Metatarsus four times as long as tarsus.

First post-spiracular abdominal sternite with two elongate, blade-like ctenidia extending beyond anterior margin of succeeding sternite; ctenidium on left side of body malformed (fig. 70).

FEMALES: Total length, 9.0 to 15.0 mm.

	LENGTH	WIDTH
Chelicerae	2.6– 3.7 mm.	1.0–1.6 mm.
Propeltidium	1.0– 1.5	1.9–2.3
Palpi	6.5– 9.5	—
First legs	5.0– 7.5	—
Fourth legs	10.0–13.0	—

Allotype larger.

Color and marks same as in male except peltidial and abdominal tergites dusky and dusky area of legs extending onto tarsi.

Dentition of chelicerae somewhat variable but generally same as that of *T. plicatus* except there are three intermediate teeth between medial and anterior teeth of fixed finger and fondal tooth formula is I, III, II, IV for both rows.

Structure otherwise similar to male except first post-spiracular abdominal sternite apparently lacking ctenidia.

Opercula of genital segment as shown in figure 71.

TYPE LOCALITY: Male holotype from Mercury, Nevada, April 7, 1960 (Elden Beck). Female allotype and female paratype from same locality, July 19, 1960 (Elden Beck). Female paratype, same locality, July 27, 1960 (Elden Beck). All types in the American Museum of Natural History.

RECORDS: Nevada: Mercury, July 11, 1960, one female (Elden Beck), July 15, 1960, one female (Elden Beck), July 16, 1960, one female (Elden Beck), July 17, 1960, one female (Elden Beck), July 21, 1960, one female (Elden Beck), July 27, 1960, one female (Elden Beck).

Arcus GROUP (NEW)

Small to moderate-sized species. Males with mesial groove of fixed finger a narrow, shallow groove containing no distinct carinae. Apical plumose bristles of flagellum complex not enlarged or flattened but

arched over basal portion of groove. Ventral tubular bristles of complex situated in row just above fondal notch. Only known female with opercula expanded and lobate at the ectocaudal angle. Ectal and mesial rows of fondal teeth graded in size I, III, II, IV or I, II, III, IV.

TYPICAL SPECIES: *Therobates arcus*, new species.

KEY TO MALES

- 1. Fondal teeth graded in size I, III, II, IV *Therobates arcus*, new species
Fondal teeth graded in size I, II, III, IV 2
- 2. Small species, fondal notch obscure and bearing denticules
 *Therobates macswaini*, new species
Moderate-sized species, fondal notch distinct and without denticules
 *Therobates cuyamacanus*, new species

Therobates arcus, new species

Figures 9–15

DIAGNOSIS: The opercula of the female described here are reminiscent of those of *T. iviei* Muma and *T. malkini*. It is possible that the latter two species belong in this group rather than in the *branchi* group in which they were described. Males must be collected before definite associations can be made.

The arched fixed finger of the male, the number of abdominal ctenidia (six), and the number of palpal papillae (40–60) distinguish this species from others of the group.

MALE HOLOTYPE: Total length, 14.0 mm.

	LENGTH	WIDTH
Chelicerae	4.7 mm.	2.0 mm.
Propeltidium	2.4	3.6

Legs and palpi mangled, not measurable.

Color in alcohol somewhat faded but apparently light to straw yellow marked with dusky reticulate purple. Propeltidium dusky except for a median ovate area extending from dark eye tubercle to posterior margin. Mesopeltidium, metapeltidium, and abdominal tergites darker yellow than non-sclerotized areas but apparently not dusky. Palpi dusky on apical ends of femora and all of tibiae, metatarsi, and tarsi. Legs dusky on distal ends of femora and proximal ends of tibiae. Leg markings more distinct on fourth legs. Malleoli white.

Dentition of chelicerae as shown in figures 10 and 11. Movable finger with a large, slender, principal tooth and one small intermediate tooth located at base of principal tooth. Fixed finger long, slender, and lightly

bowed or arched. All fondal teeth distinct from dentate socket margin of movable finger. Fondal teeth graded in size I, III, II, IV. Fondal notch J-shaped, somewhat wider than base of fixed finger and containing one denticule.

Groove of fixed finger a shallow, parallel-sided slot that is mesoventral but not extending to base of finger. Flagellum complex typical of group, with dorsal tubular bristles not strongly arched and apical plumose bristles slightly S-shaped but not flattened or otherwise modified. Mesial setae of movable finger plumose on proximal half of finger but simple distally.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Metatarsus and tibia of palpus with scattered, long, slender spines; long, heavy cylinder bristles below and small fine ones above. Metatarsus with a scopula of 50 to 60 widely spaced papillae extending entire length of segment (fig. 12). Metatarsus of palpus about 3.5 times as long as tarsus.

First post-spiracular abdominal sternite provided with four long flattened ctenidia extending well beyond posterior margin of succeeding segment (fig. 13).

FEMALE ALLOTYPE: Total length, 18.0 mm.

	LENGTH	WIDTH
Chelicerae	5.8 mm.	2.5 mm.
Propeltidium	3.0	4.4
Palpi	14.0	—
First legs	11.5	—
Fourth legs	17.0	—

Color in alcohol similar to that of male.

Dentition of chelicerae as shown in figures 14 and 15. Movable finger with principal tooth moderately large, three intermediate teeth of which anterior is tiny and denticulate, an anterior tooth slightly smaller than principal tooth, uneven serration in front of anterior tooth, and low ridge in place of mesial tooth. Fixed finger with principal and medial teeth equally large, smaller anterior tooth, two intermediate teeth between principal and medial teeth, two between medial and anterior teeth, and indistinct serration in front of anterior tooth. Fondal teeth same as in male.

Structure similar to that of male except there is no scopula on the metatarsus of palpus and no distinct ctenidia on first post-spiracular abdominal sternite.

Opercula of genital segment as shown in figure 9.

TYPE LOCALITY: Male holotype and female allotype from Taft, California, February 25, 1921 (E. O. Essig), in the American Museum of Natural History.

***Therobates macswaini*, new species**

Figures 16, 17

REMARKS: This species may be the male of either *T. ivei* or *T. malkini*, but the two sexes must be collected together before a placement can be made.

The hooked fixed finger, narrow fondal notch, and short length of the abdominal ctenidia distinguish this species.

MALE HOLOTYPE: Total length, 16.0 mm.

	LENGTH	WIDTH
Chelicerae	4.2 mm.	1.5 mm.
Propeltidium	2.1	2.8
Palpi	16.0	—
First legs	12.0	—
Fourth legs	20.0	—

Color in alcohol similar to that of *T. arcus* except there are three longitudinal dusky stripes on chelicerae, markings on propeltidium more distinct, and legs dusky on femora, tibiae, and metatarsi.

Dentition similar to that of *T. arcus* except fixed finger not bowed but hooked downward at its distal end, fondal notch narrow and obscure, and fondal teeth graded I, II, III, IV in size (fig. 16).

Structure similar to that of *T. arcus* except this species smaller and ctenidia on first post-spiracular abdominal segment tubular and not extending to posterior margin of succeeding segment (fig. 17). Two of the ctenidia are broken off on the holotype.

TYPE LOCALITY: Male holotype from Crystal Lake, Los Angeles County, California, June 29, 1950 (J. W. MacSwain), in the American Museum of Natural History.

***Therobates cuyamacanus*, new species**

Figures 18, 19

DIAGNOSIS: The close structural relationship between this species and *T. arcus* indicates that the two are possible variations of the same form. The different size gradation in the fondal teeth and the relative difference

in the scopula of the palpus seem, however, to preclude such a possibility.

MALES: Total length, 21.0 mm.

	LENGTH	WIDTH
Chelicerae	5.4– 5.8 mm.	2.3–2.5 mm.
Propeltidium	2.7– 2.9	4.0–4.44
Palpi	17.0–19.0	—
First legs	13.5–15.5	—
Fourth legs	24.5–25.5	—

Holotype larger.

Color and markings in alcohol apparently almost identical with those of *T. arcus*. The holotype of the latter species has been preserved for a much longer period of time and is somewhat faded.

Dentition similar to that of *T. arcus* except both fixed and movable fingers slightly undulate rather than arched, and fondal teeth graded in size I, II, III, IV (fig. 18).

Structure very similar to that of *T. arcus* except scopula on metatarsus of palpus composed of 40 or fewer papillae and very thin distally (fig. 19).

TYPE LOCALITY: Male holotype and paratype from Cuyamaca, California, April 20, 1950 (Linsley and MacSwain), in the American Museum of Natural History.

Andreasana GROUP (New)

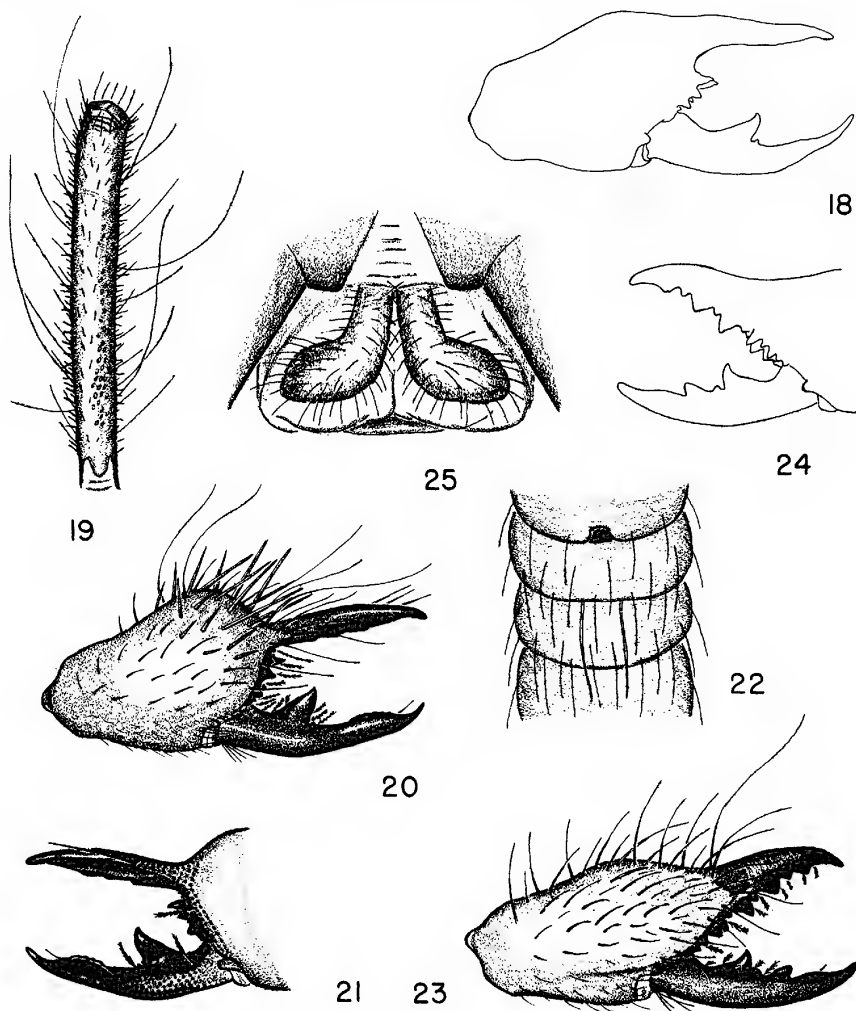
Small species. Males with mesial groove of fixed finger a distinct to indistinct shallow trough along ventral margin of finger. Apical plumose bristle and apical striate bristle of flagellum complex somewhat flattened and elongated. Basal or ventral tubular bristles situated in a group below and behind fondal notch. Fondal notch obscure. Females with posterior portions of genital opercula extended ectally into a boot-like form. Ectal row of teeth graded in size II, III, I, IV; mesial row, I, III, II, IV. Metatarsi of palpi provided with usual clothing.

This species group has affinities with the *branchi* group of the genus in the possession of a distinct mesial groove and modified flagellar bristles on the fixed finger. The two species presently included in the group, however, have the movable finger modified in a manner similar to that of the *imperialis* group and the fondal tooth formula somewhat like that of the genus *Chambria* Muma.

Therobates andreasana, new species

Figures 20–25

DIAGNOSIS: Although this species is described as typical of the group, it



FIGS. 18, 19. *Therobates cuyamacanus*, new species. 18. Ectal view of right male chelicera. 19. Mesoventral view of apical segments of male palpus.

FIGS. 20–25. *Therobates andreasana*, new species. 20. Ectal view of right male chelicera. 21. Mesial view of right male chelicera. 22. Male abdominal ctenidia. 23. Ectal view of right female chelicera. 24. Mesial view of right female chelicera. 25. Ventral view of female genital opercula.

probably represents one extreme of the intra-group variation, with the following species representing the other extreme.

The shallow mesial groove on the movable finger, hooked fixed finger, and two very long abdominal ctenidia distinguish this species from all

other species of the genus *Therobates* Muma.

MALES: Total length, 13.0 to 16.0 mm.

	LENGTH	WIDTH
Chelicerae	3.0– 3.7 mm.	1.2–1.5 mm.
Propeltidium	1.5– 1.7	2.3–2.8
Palpi	13.0–16.0	—
First legs	9.5–12.0	—
Fourth legs	15.5–20.5	—

Holotype larger.

Color in alcohol light to straw yellow, with dusky purplish markings as follows: eye tubercle dark, propeltidium dusky except for a light area on each side of eye tubercle and a light, median, ovate area; mesopeltidium, metapeltidium, and abdominal tergite irregularly marked; palpi dusky on tarsi, metatarsi, tibiae, and apical ends of femora; legs dusky on apical ends of femora and basal ends of tibiae. Malleoli white.

Dentition of chelicerae somewhat variable but following general pattern of figures 20 and 21. Movable finger with principal tooth large; two minute intermediate teeth located on and at base of principal tooth; anterior tooth replaced by a rounded elevation, margin of which armed with nodules forming the dorso-ectal edge of mesial groove at tip of finger; mesial tooth absent. Fondal notch obscure, somewhat narrower than width of fixed finger and bearing two or three denticules. Fixed finger gradually tapered from base to tip which is lightly hooked downward; ventral margin of finger bearing aborted teeth which give it a dentate profile.

Mesoventral groove of fixed finger distinct apically but indistinct basally, apparently extending three-fourths of length of finger. Flagellum complex consisting of dorsal row of striate bristles, mesial row of plumose bristles that become striate apically, and basal group of tubular bristles. Mesial plumose bristles of movable finger extending nearly to apical end of articulation area.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by less than a diameter. Propeltidium wider than long by a ratio of 1 to 1.5.

Metatarsus, tarsus, and tibia of palpus sparsely provided with large cylinder bristles below and short fine ones above, as well as usual long, slender spines. Metatarsus of palpus without scopula and about four times as long as tarsus.

First post-spiracular abdominal sternite provided with two long slender ctenidia that extend well beyond anterior margin of succeeding sternite (fig. 22).

FEMALE ALLOTYPE: Total length, 20.0 mm.

	LENGTH	WIDTH
Chelicerae	5.6 mm.	2.0 mm.
Propeltidium	2.3	3.8
Palpi	13.0	—
First legs	17.0	—
Fourth legs	Fragmented	

Color and markings in alcohol same as in males except dusky markings somewhat fainter.

Dentition of chelicerae as shown in figures 23 and 24. Movable finger with principal tooth large, one intermediate tooth nearer principal tooth, anterior tooth about two-thirds as large as principal tooth, indistinct serration in front of anterior tooth, and no mesial tooth. Fixed finger with principal tooth large, medial tooth slightly smaller and anterior slightly smaller than medial tooth; one intermediate tooth and one denticule between principal and medial teeth and one intermediate tooth between medial and anterior teeth. Fondal teeth same as in male.

Structure same as in male except first post-spiracular abdominal sternite provided with only two trace ctenidia scarcely distinguishable from abdominal setal clothing.

Opercula of genital segment as shown in figure 25.

TYPE LOCALITY: Male holotype, female allotype, and male paratype from Andreas Canyon, Riverside County, California, April 24, 1954 (J. G. Rozen), in the American Museum of Natural History. Male paratypes at the University of California.

RECORDS: California: Andreas Canyon, Riverside County, April 24, 1954, three males (M. Wasbauer); Palm Springs, April 20, 1951, one male (E. I. Schlinger).

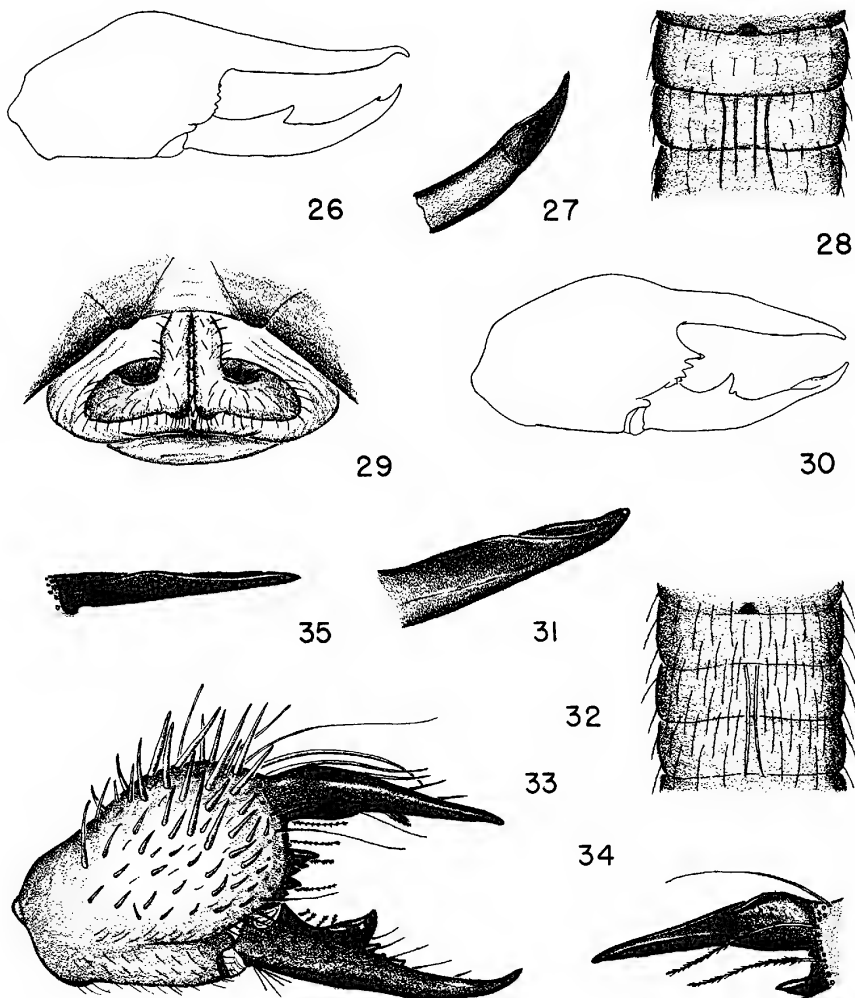
Therobates larreae, new species

Figures 26–29

DIAGNOSIS: The fondal tooth pattern varies from specimen to specimen in this species, so a series will have to be examined to determine the exact formula.

Males are easily distinguished by the cup-like structure on the movable finger of the chelicerae. Female structures, except for the opercula, are not distinctive.

MALE HOLOTYPE: Total length, 9.5 mm.



FIGS. 26-29. *Therobates larreae*, new species. 26. Ectal view of right male chelicera. 27. Dorsal view of tip of movable finger of right male chelicera. 28. Male abdominal ctenidia. 29. Ventral view of female genital opercula.

FIGS. 30-32. *Therobates rothi*, new species. 30. Ectal view of right male chelicera. 31. Dorsal view of tip of movable finger of right male chelicera. 32. Male abdominal ctenidia.

FIGS. 33-35. *Therobates striodorsalis*, new species. 33. Ectal view of right male chelicera. 34. Mesial view of fixed finger of right male chelicera. 35. Dorsal view of right male chelicera.

	LENGTH	WIDTH
Chelicerae	2.4 mm.	0.9 mm.
Propeltidium	1.4	1.5
Palpi	11.0	—
First legs	8.0	—
Fourth legs	14.0	—

Color in alcohol white to light yellow, with dusky purplish markings as in *T. andreasana* except mesopeltidium, metapeltidium, and abdominal tergites light and there are two faint dusky stripes on chelicerae.

Dentition of chelicerae as shown in figures 26 and 27. Movable finger evenly curved from base to tip, principal tooth small, intermediate and anterior teeth missing, apical sixth of finger formed into mesially facing, cup-like structure, mesial tooth absent. Fondal notch obscure and without denticles. Fixed finger lightly curved upward, abruptly narrowed and hooked downward at tip; ventral margin of finger undulate but not bearing aborted teeth.

Mesoventral groove of fixed finger distinct and occupying most of length of finger. Flagellum complex typical of group, with apical striate and plumose bristles strikingly prominent. Mesial plumose bristles of movable finger restricted to base of articulation area. Eye tubercle situated on anterior margin of propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.1.

Metatarsus, tarsus, and tibia of palpus with usual clothing of cylinder bristles and long, slender spines. Metatarsus without scopula but with two unequal rows of stout spines and about four times as long as tarsus.

First post-spiracular abdominal sternite with four long, slender ctenidia extending well beyond anterior margin of succeeding sternite (fig. 28). Middle pair slightly shorter.

FEMALES: Total length, 12.0 to 13.0 mm.

	LENGTH	WIDTH
Chelicerae	2.8– 3.1 mm.	0.9–1.1 mm.
Propeltidium	1.3– 1.6	1.6–2.1
Palpi	8.0– 9.0	—
First legs	6.0– 7.0	—
Fourth legs	12.0–13.0	—

Female allotype larger.

Color and markings in alcohol similar to those of male.

Dentition of chelicerae similar to that of *T. andreasana* except there are two intermediate teeth in front of medial tooth of fixed finger.

Structure similar to that of male except ctenidia on first post-spiracular abdominal sternite scarcely distinguishable from setal clothing.

Opercula of genital segment as shown in figure 29.

TYPE LOCALITY: Male holotype from Mule Canyon, Calico Mountains, San Bernardino County, California, beating *Larrea*, March 17, 1955 (P. D. Hurd). Female holotype from Mule Canyon, Calico Mountains, San Bernardino County, California, beating *Larrea*, March 11, 1955 (Hurd and Wasbauer). Female paratypes from the same locality, taken in the same manner on the same date (M. Wasbauer). All types are in the American Museum of Natural History; the paratypes are at the University of California.

Imperialis GROUP

Therobates rothi, new species

Figures 30–32

DIAGNOSIS: This species is somewhat smaller than *T. imperialis* Muma, the typical species of this group, and lacks a distinct cup on the movable finger but otherwise seems to belong here. The enlargement and flattening of the apical dorsal striate bristles are reminiscent of the genus *Hemero-trecha* Banks.

The ridged meso-apical surface of the male movable cheliceral finger distinguishes this small species.

MALE HOLOTYPE: Total length, 12.0 mm.

	LENGTH	WIDTH
Chelicerae	2.6 mm.	1.5 mm.
Propeltidium	2.1	2.6
Palpi	15.0	—
First legs	10.5	—
Fourth legs	18.0	—

Color in alcohol somewhat faded but apparently nearly identical with that of *T. andreasana* except abdominal tergites dark. Malleoli apparently with dark margins.

Dentition of chelicerae as shown in figures 30 and 31. Movable finger with principal tooth large, one tiny intermediate tooth just in front of principal tooth, anterior tooth missing, two low ridges near attenuated apex of finger that overlap, forming a dorsal groove and a mesial shallow cup, and mesial tooth missing. Fondal notch U-shaped, somewhat wider than base of fixed finger and lacking denticules. Fixed finger lightly sinuate and gradually tapering from base to tip.

Groove of fixed finger an indistinct mesoventral hollow not extending to base of finger. Flagellum complex with apical bristles of dorsal tubular series enlarged and flattened and those of mesial plumose series slightly

enlarged but not distinctly flattened. Mesial setae of movable finger not distinctly plumose.

Eye tubercle located on anterior margin of propeltidium, with eyes separated by slightly more than one diameter. Propeltidium wider than long by a ratio of 1 to 1.3.

Metatarsus, tarsus, and tibia of palpus sparsely provided with large cylinder bristles below and short fine ones above, as well as usual long hairs and series of slender spines. Metatarsus of palpus with scopula and about four times as long as tarsus.

First post-spiracular abdominal sternite provided with two long, blade-like ctenidia extending beyond posterior margin of second successive segment (fig. 32).

TYPE LOCALITY: Male holotype from Wellton, Yuma County, Arizona (Gene Lorange), in the American Museum of Natural History.

Striodorsalis GROUP

Small species. Males with mesial groove of fixed finger a distinct narrow slot on dorsomesial surface. Basal portion of fixed finger expanded into dorsal and ectodorsal ridges. Apical plumose bristle of flagellum complex expanded and flattened basally, covering mesial groove. Ventral or basal tubular bristles of complex situated in a group above and behind fondal notch. Females unknown. Fondal teeth of both rows graded in size I, III, II, IV.

TYPICAL SPECIES: *Therobates striodorsalis*, new species.

This species group has the general appearance of the genus *Hemerotrecha* Banks because of the small size of the specimens, deep purplish color of the abdomen, and a slight flattening of the dorsal striated bristles. Morphologically the group has strong affinities with the *branchi* and *bilobatus* groups of the genus *Therobates* Muma.

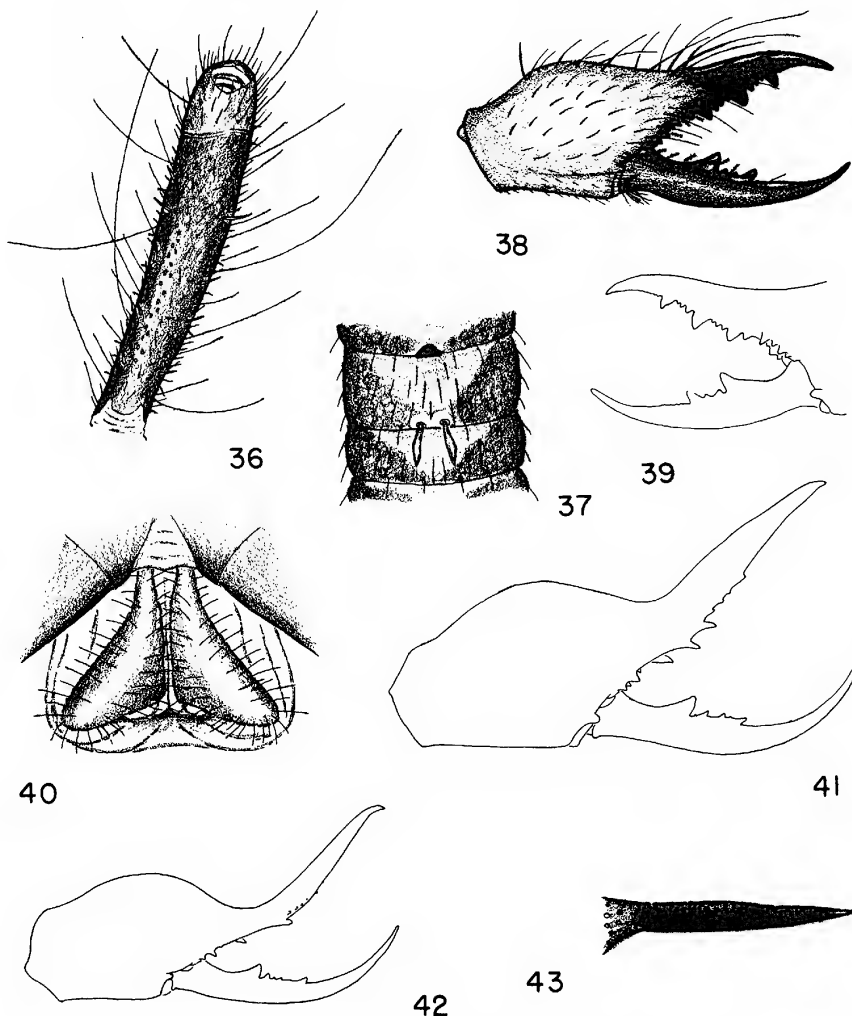
***Therobates striodorsalis*, new species**

Figures 33–37

DIAGNOSIS: This small species is easily distinguished from other species of *Therobates* Muma by the striking abdominal coloration.

MALES: Total length, 12.0 to 13.0 mm.

	LENGTH	WIDTH
Chelicerae	3.1– 3.0 mm.	1.3–1.4 mm.
Propeltidium	1.4– 1.7	2.3–2.2
Palpi	10.0–10.0	—
First legs	9.0– 8.0	—
Fourth legs	14.0–14.0	—



FIGS. 36, 37. *Therobates striodorsalis*, new species. 36. Mesoventral view of right male palpus. 37. Male abdominal ctenidia.

FIGS. 38-40. *Chanbria regalis* Muma. 38. Ectal view of right female chelicera. 39. Mesial view of right female chelicera. 40. Ventral view of female genital opercula.

FIG. 41. *Chanbria tehachapianus*, new species, ectal view of right male chelicera.

FIGS. 42, 43. *Chanbria rectus*, new species. 42. Ectal view of right male chelicera. 43. Dorsal view of fixed finger of right male chelicerae.

Holotype larger.

Color in alcohol rusty yellow, with dusky purplish markings as follows: eye tubercle dark; propeltidium, mesopeltidium, and metapeltidium dusky; abdominal tergites dark but scarcely darker than deep purplish abdomen; legs and tarsi dusky on apical two-thirds of femora and all of tibiae, metatarsi, and tarsi. Malleoli light.

Dentition of chelicerae as shown in figures 33 to 35. Movable finger with principal tooth large, anterior tooth reduced to a low pointed ridge, two intermediate teeth of which proximal is larger, and no mesial tooth. Fixed finger evenly curved but considerably expanded on basal half. Fondal notch U-shaped, obscure, about one-half as wide as base of fixed finger and bearing one minute denticle on ventral margin.

Groove of fixed finger a distinct but shallow dorsomesial slot extending almost to base of finger. Flagellum complex consisting of a dorsal row of flattened, faintly striated, curved bristles, a mesial series of plumose bristles of which apical flattened and covering basal portion of groove and a basal or ventral series of tubular bristles. Mesial setae of movable finger plumose only on basal quarter of articulation area.

Eye tubercle situated on anterior margin of propeltidium. Eyes separated by about one diameter. Propeltidium wider than long by a ratio of 1 to 1.6.

Metatarsus, tarsus, and tibia of palpus sparsely provided with large cylinder bristles below and short fine ones above, as well as the usual longer, slender spines. Metatarsus and tibia also having two ventral unequal rows of short stout spines. Metatarsus also with a ventral scopula of about 20 small papillae (fig. 36).

First post-spiracular abdominal sternite provided with two flattened blade-like ctenidia extending almost to posterior margin of succeeding segment (fig. 37).

TYPE LOCALITY: Male holotype from Pine Valley, San Diego County, California, July 10, 1953 (W. J. and J. W. Gertsch), in the American Museum of Natural History. Male paratype from Idyllwild, Riverside County, California, July 7, 1953 (W. J. and J. W. Gertsch), in the American Museum of Natural History.

GENUS *CHANBRIA* MUMA

The key given below is a revision of that in Muma (1951, p. 96).

A modification of the original generic description appears to have been made necessary by the inclusion of the additional species. There are only two ectal fondal teeth in *C. tehachapianus*, new species. They seem to represent III and IV, with III being the larger. I and II in the ectal row

may be small but present or completely missing in the genus. Females frequently lack ectal fondal tooth I or II, or both.

KEY TO MALES

1. Fixed finger sinuate and lacking aborted teeth. *Chanbria serpentinus* Muma
Fixed finger strongly bent dorsally and bearing aborted teeth. 2
2. Fixed finger straight from dorsal view and bearing only one aborted tooth
and several denticules. *Chanbria rectus*, new species
Fixed finger bent mesially from a dorsal view and bearing two aborted teeth
and several denticules. 3
3. Metatarsus of palpus without a scopula; fixed finger of chelicerae constricted
near tip and attenuated. *Chanbria tehachapianus*, new species
Metatarsus of palpus with scopula; fixed finger of chelicerae not constricted
and attenuated near tip. *Chanbria regalis* Muma

Chanbria regalis Muma

Figures 38–40

Chanbria regalis MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 96, figs. 178–181 (male).

DIAGNOSIS: Although the collection times and localities of the holotype and allotype are not the same, many morphological similarities exist. Until additional material of this genus is available, there seems to be no reason, with a single female, to add the name of another species to the literature.

The common occurrence of cheliceral supernumeraries and distinctive opercula distinguish females. Males have a diagnostic cheliceral profile.

FEMALE ALLOTYPE: Total length, 27.0 mm.

	LENGTH	WIDTH
Chelicerae	7.4 mm.	2.5 mm.
Propeltidium	3.2	4.7
Palpi	25.0	—
First legs	16.5	—
Fourth legs	31.5	—

Color in alcohol almost identical with that of male, only divergence on palpus where apical ends of femora and tibia and all of metatarsi and tarsi are dusky.

Dentition of chelicerae as shown in figures 38 and 39. Movable finger with principal tooth moderately large, anterior tooth slightly smaller than principal tooth, two intermediate teeth alternating with indistinct denticules, an irregular serration in front of anterior tooth, and no distinct mesial tooth. Fixed finger with principal and medial teeth subequal,

anterior tooth slightly smaller than principal tooth, three intermediate teeth between principal and medial teeth, three between medial and anterior teeth, and an uneven serration in front of anterior tooth. Fondal teeth same as in male except tooth 1 in the ectal row missing.

Structure similar to that of male. Metatarsus of palpus without scopula but with some of cylinder bristles three to four times length of majority. First post-spiracular abdominal segment lacking distinct or trace ctenidia.

Opercula of genital segment as shown in figure 40.

TYPE LOCALITY: Male holotype and paratype from Twentynine Palms, California, July 1 to 15, 1945 (Jefferson H. Branch); female allotype from Palm Springs, Riverside County, California, July 9, 1950 (Paul D. Hurd). All in the American Museum of Natural History.

Chanbria tehachapianus, new species

Figure 41

DIAGNOSIS: This species, *C. rectus*, new species, and *C. regalis* are closely related but can be distinguished readily by the characters given in the key above. The lack of a palpal scopula is particularly diagnostic.

A female collected by V. Roth from Sonora, Mexico, 20 miles southeast of San Luis R.C., Laguna Prieta, June 6, 1959, has supernumerary intermediate teeth on the movable finger and probably belongs in this species.

MALE HOLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	7.4 mm.	2.4 mm.
Propeltidium	3.5	4.5

Legs and palpi mangled and not measurable.

Specimen shriveled and faded by preservation, but color in alcohol apparently similar to that of *regalis*.

Dentition also similar to that of *C. regalis*. The most striking difference in dentition is the constriction and attenuation of the fixed finger of the present species (fig. 41). Another distinct difference is the complete lack of fondal teeth I and II on this species, whereas *C. regalis* has these teeth small but distinct. In addition there are two tiny supernumerary intermediate teeth on the movable finger.

Structure similar to that of *C. regalis*, but this species lacks a scopula on the metatarsus of the palpus whereas *C. regalis* has a basal scopula composed of numerous papillae.

TYPE LOCALITY: Male holotype from Tehachapi Mountains, California, September 8, 1914, in the American Museum of Natural History.

Chanbria rectus, new species

Figures 42, 43

DIAGNOSIS: This species is most closely related to *C. regalis*, from which it differs by having a straight fixed finger, in dorsal view, and a reduced number of aborted teeth on the fixed finger.

MALE HOLOTYPE: Total length, 23.0 mm.

	LENGTH	WIDTH
Chelicerae	6.1 mm.	1.2 mm.
Propeltidium	2.5	3.0
Palpi	23.0	—
First legs	13.0	—
Fourth legs	25.5	—

Color in alcohol white to light yellow, with following dusky purple markings: propeltidium dusky except along posterior margin and along a median stripe; median plagula dusky; all legs dusky at apical ends of femora; palpi dusky at apical ends of femora and tibiae.

Dentition of chelicerae similar to that of *C. regalis* with following exceptions: right chelicera with supernumerary intermediate tooth on movable finger; only one distinguishable aborted tooth on fixed finger; remnants of aborted teeth present on *C. regalis* as denticles (fig. 42); fixed finger straight apically (fig. 43).

Structure otherwise very similar to that of *C. regalis*. Scopula on metatarsus of palpus composed of about 80 papillae and extending about three-fourths of length of segment.

FEMALES: No adult females of this species have been seen, but there is a young female in the vial with the holotype. Its dental pattern is quite similar to that of the female of *C. regalis* except for a supernumerary intermediate tooth between the principal and medial teeth of the right fixed finger.

TYPE LOCALITY: Male holotype and immature female from Barstow, San Bernardino County, California, June 16, 1950 (J. W. MacSwain), in the American Museum of Natural History.

GENUS *HEMEROTRECHA* BANKS*Banksi* GROUP*Hemerotrecha banksi* Muma

Hemerotrecha banksi MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 99, figs. 185–192 (male and female).

RECORDS: Idaho: Obermeyer Ranch, Goin County, July 24, 1940, one female (Jellison).

REMARKS: This is the first record for the species outside the state of California.

Hemerotrecha californica (Banks)

Cleobis californica BANKS, 1899, Proc. Ent. Soc. Washington, vol. 4, pp. 314–315 (female).

Hemerotrecha californica, MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 100, figs. 193–196 (male and female).

RECORDS: Idaho: Five miles east of Atomic City on Highway 20, July 2, 1952, one male (B. Malkin). Nevada: Mercury, May 24, 1960, one female; June 6, 1960, one female; June 9, 1960, one male; June 20, 1960, one female; June 22, 1960, one female; June 26, 1960, one female; June 30, 1960, one female; July 2, 1960, one male and two females; July 4, 1960, one male; July 11, 1960, one male and one female; July 13, 1960, one male; July 15, 1960, one male; July 25, 1960, one male; all collected by Elden Beck.

REMARKS: This species is now known from California, Oregon, Washington, Nevada, and Idaho.

Serrata GROUP

The collection of additional males and a female of this group indicates that the fondal tooth formula is I, III, IV, II for both ectal and mesial rows rather than that reported in Muma (1951, p. 102).

Hemerotrecha serrata Muma

Figures 72, 73

Hemerotrecha serrata MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, pp. 102–104, figs. 202–204 (male).

DIAGNOSIS: Males of this species are easily distinguished by the serrated upper margin of the dorsally flexed fixed finger. Females have distinctive opercula which are reminiscent of those of *T. bilobatus*.

FEMALE ALLOTYPE: Total length, 21.0 mm.

	LENGTH	WIDTH
Chelicerae	5.4 mm.	2.0 mm.
Propeltidium	1.9	3.7
Palpus	17.0	—
First legs	12.0	—
Fourth legs	24.0	—

Color and markings in alcohol same as those of male except markings paler.

Dentition as shown in figure 72, nearly the same as that of *H. californica* Banks except there is a distinct acute mesial tooth on the movable finger.

Structure similar to that of male. No scopula on metatarsus of palpus and no ctenidia on first post-spiracular abdominal sternite.

Opercula of genital segment as shown in figure 73.

TYPE LOCALITY: Male holotype, Twentynine Palms, California, July to August, 1945 (Jefferson H. Branch), in the American Museum of Natural History. Female allotype and male from unknown locality, August 24, 1960 (Ingersoll), also in the American Museum of Natural History.

RECORDS: Nevada: Mercury, one male, July 27, 1960; one male, July 17, 1960; one male, July 21, 1960; one male, July 11, 1960; one male, August 16, 1960; all collected by Elden Beck.

Texana GROUP

Hemerotrecha denticulata Muma

Hemerotrecha denticulata MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, pp. 105–106, figs. 211–216 (male and female).

RECORDS: Utah, LaPoint, October 3, 1954, two males (G. F. Knowlton and D. W. Davis).

REMARKS: The two males recorded here have six abdominal ctenidia as opposed to the four normally found in the species. As this character seems to be the only variant, they are recorded here as atypical specimens of the species.

Hemerotrecha fruitana Muma

Hemerotrecha fruitana MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 106, figs. 217, 218 (male).

RECORDS: New Mexico: Albuquerque, May, 1948, one male (C. C. Hoff). Nevada: Mercury, June 9, 1960, one male (Elden Beck).

REMARKS: The male recorded above was collected on the side of a house. This species is now known from widely separated localities in Utah, California, Wyoming, and New Mexico.

Hemerotrecha nevadensis Muma

Hemerotrecha nevadensis MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 110, figs. 223, 224 (female).

RECORDS: Nevada: Kyle Canyon, Charleston Mountains, April 2, 1953, one female (J. W. MacSwain).

REMARKS: Only the holotype has been previously known.

Hemerotrecha simplex Muma

Hemerotrecha simplex MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 110, figs. 225–227 (male).

RECORDS: Arizona: South rim of Grand Canyon, June, 1954, one male (M. A. Cazier).

REMARKS: This is the fourth record for this species.

***Hemerotrecha jacintoana*, new species**

Figures 44, 45

REMARKS: Although this species may be the female of *H. fruitana*, its much larger size, darker coloration, and distinctive opercula have prompted its description under this name for the present. It differs from other female specimens of *Hemerotrecha* Muma by the strikingly different opercula.

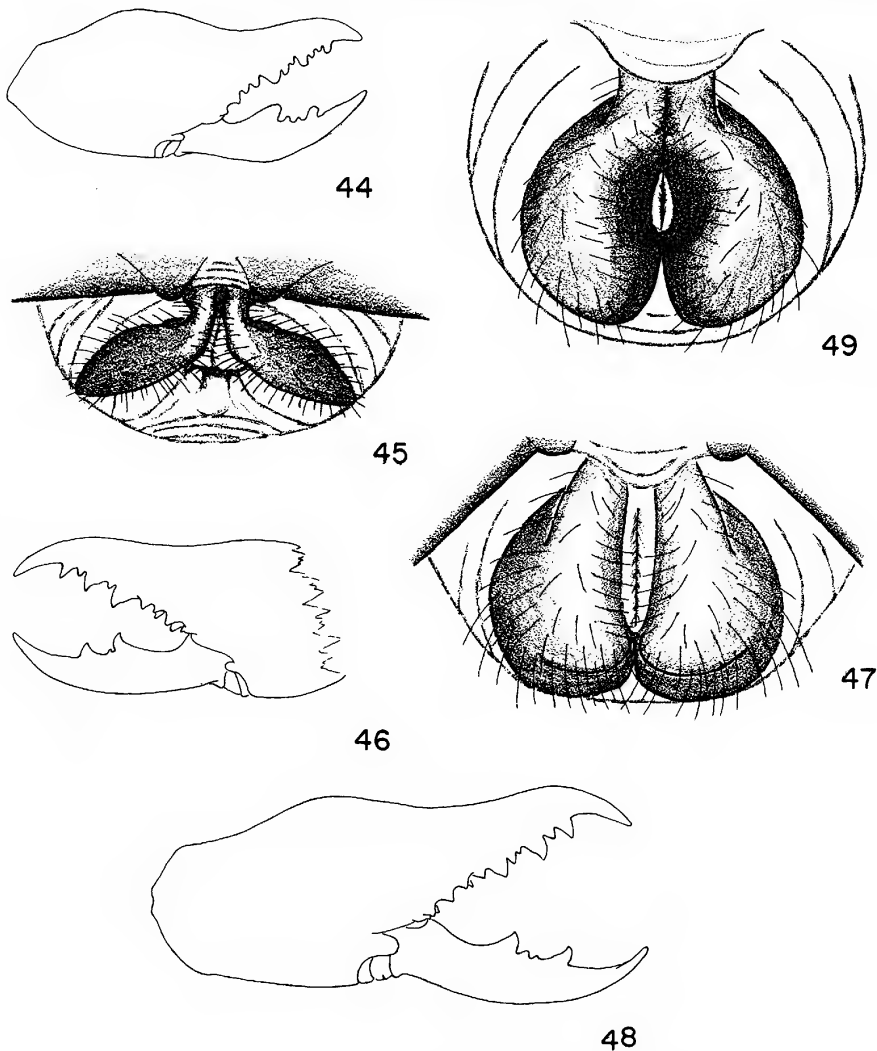
FEMALE HOLOTYPE: Total length, 20.5 mm.

	LENGTH	WIDTH
Chelicerae	5.2 mm.	2.1 mm.
Propeltidium	2.6	3.6
Palpi	14.0	—
First legs	10.5	—
Fourth legs	18.5	—

Color and markings in alcohol very similar to those of *H. fruitana* except they are darker and more distinct.

Dentition worn (fig. 44). Two intermediate teeth present between primaries on both fingers; a mesial tooth present on movable finger, and fondal teeth of both rows seem to be graded in size I, III, II, IV.

Mesial setae of movable finger plumose on basal half of articulation area. Eye tubercle situated on anterior margin of propeltidium. Eyes separated by about one and one-fourth of a diameter. Propeltidium wider than long by a ratio of 1 to 1.4.



FIGS. 44, 45. *Hemerotrecha jacintoana*, new species. 44. Ectal view of right female chelicera. 45. Ventral view of female genital opercula.

FIGS. 46, 47. *Hemerotrecha milsteadii*, new species. 46. Ectal view of left female chelicera. 47. Ventral view of female genital opercula.

FIGS. 48, 49. *Hemerotrecha marathoni*, new species. 48. Ectal view of right female chelicera. 49. Ventral view of female genital opercula.

Tarsus, metatarsus, and tibia of palpus provided with usual cylinder bristles, unequal rows of stout spines and long, slender hairs, but no scopula on the metatarsus.

First post-spiracular abdominal sternite with four trace ctenidia.

Figure 45 shows the distinctive opercula.

TYPE LOCALITY: Female holotype from Idyllwild, San Jacinto Mountains, California, June 17–18, 1952 (M. Cazier, W. Gertsch, R. Schrammel).

Branchi GROUP

The collection and description of the females of two species of this group, *H. milsteadi*, new species, and *H. marathoni*, new species, permit the placement of three previously unplaced species, *Datames carolinanus* Kraepelin, *Datames sulfureus* Simon, and *Eremacantha robusta* Roewer. Originally (Muma, 1951) it was believed that the previously figured opercula (Roewer, 1934) of the types of *D. carolinanus*, *D. sulfureus*, and *E. robusta* were of immature females, but the opercula of *H. milsteadi* and *H. marathoni* are heavily sclerotized and apparently mature, though juvenile in general appearance. All five species probably belong in this group of the genus *Hemerotrecha* Banks.

Hemerotrecha minima Muma

Hemerotrecha minima MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 114, figs. 238, 239 (male).

RECORDS: Colorado: Denver, February 26, 1927, one male (S. C. Bishop).

REMARKS: The species has previously been known only from the holotype.

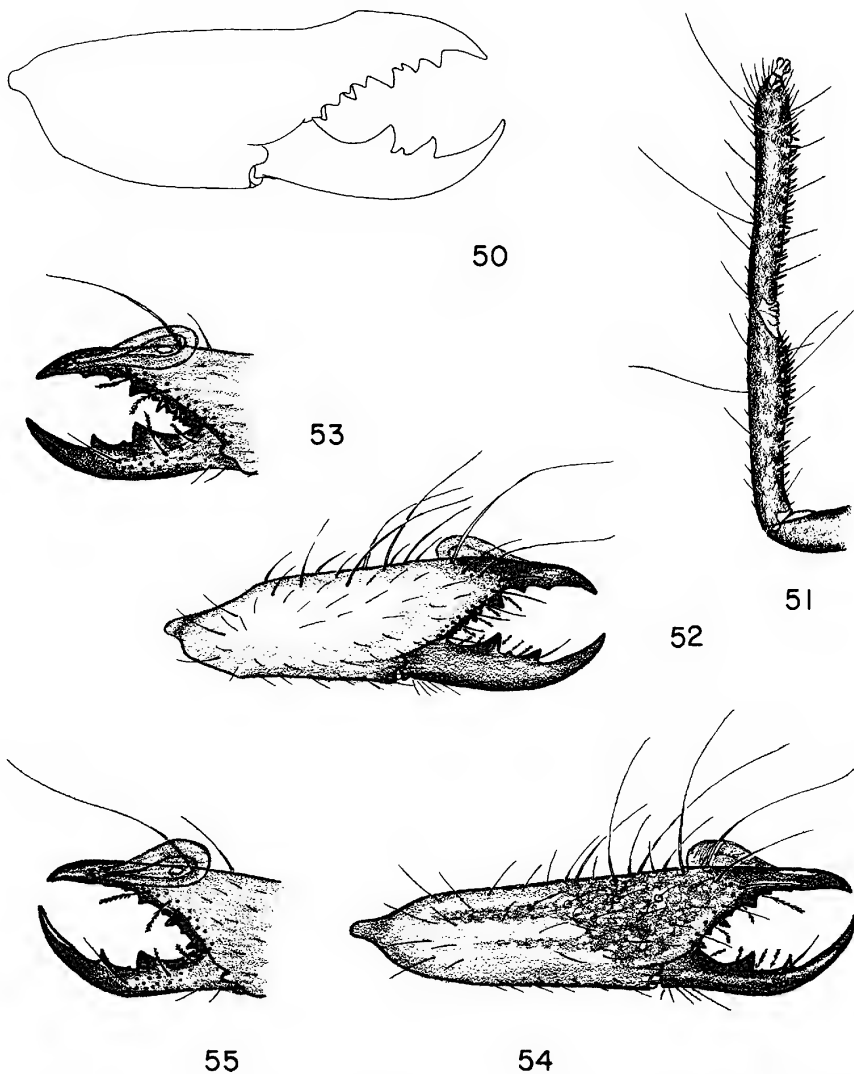
***Hemerotrecha milsteadi*, new species**

Figures 46, 47

DIAGNOSIS: This species may be the female of *H. minima*, but an association cannot be made until males and females are collected together or *in copula*. The opercula and cheliceral profile are distinctive.

FEMALE HOLOTYPE: Total length, 13.5 mm.

	LENGTH	WIDTH
Chelicerae broken and mangled, not measurable		
Propeltidium	1.3 mm.	1.9 mm.
Palpi	11.0	—
First legs	9.5	—
Fourth legs	13.0	—



FIGS. 50, 51. *Ammotrechula borregoensis*, new species. 50. Ectal view of right female chelicera. 51. Mesoventral view of right female palpus.

FIGS. 52, 53. *Ammotrechula pilosa* Muma. 52. Ectal view of right male chelicera. 53. Mesial view of right male chelicera.

FIGS. 54, 55. *Ammotrechula wasbaueri*, new species. 54. Ectal view of right male chelicera. 55. Mesial view of right male chelicera.

Color in alcohol pale yellow, with dusky markings as follows: eye tubercle dark; anterior margin of propeltidium faintly dusky around eyes; palpi dusky on tibia, metatarsus, and tarsus. Malleoli white.

Dentition as in figure 46. One intermediate tooth between primary teeth on both fingers. Mesial tooth of movable finger absent. Fondal teeth of both rows graded in size III, I, II, IV.

Mesial setae of movable finger plumose except for a few near apical end of setal articulation area. Eye tubercle situated on anterior margin of propeltidium. Eyes separated by about one and one-quarter diameters. Propeltidium wider than long by a ratio of 1 to 1.3.

Tibia, metatarsus, and tarsus of palpus provided with scattered cylinder bristles and usual long, slender hairs, but there is no scopula on metatarsus.

First post-spiracular abdominal sternite with two scarcely distinguishable trace ctenidia.

Opercula as in figure 47.

TYPE LOCALITY: Female holotype from Sierra Vieja, 11 miles west of Valentine, Presidio County, Texas (W. W. Milstead), in the American Museum of Natural History.

***Hemerotrecha marathoni*, new species**

Figures 48, 49

DIAGNOSIS: Although the holotype of the species described here is mangled and incomplete, the proportionate size of the chelicerae and propeltidium, the distinctive cheliceral dentition, and the unusual opercula have made identification and placement possible.

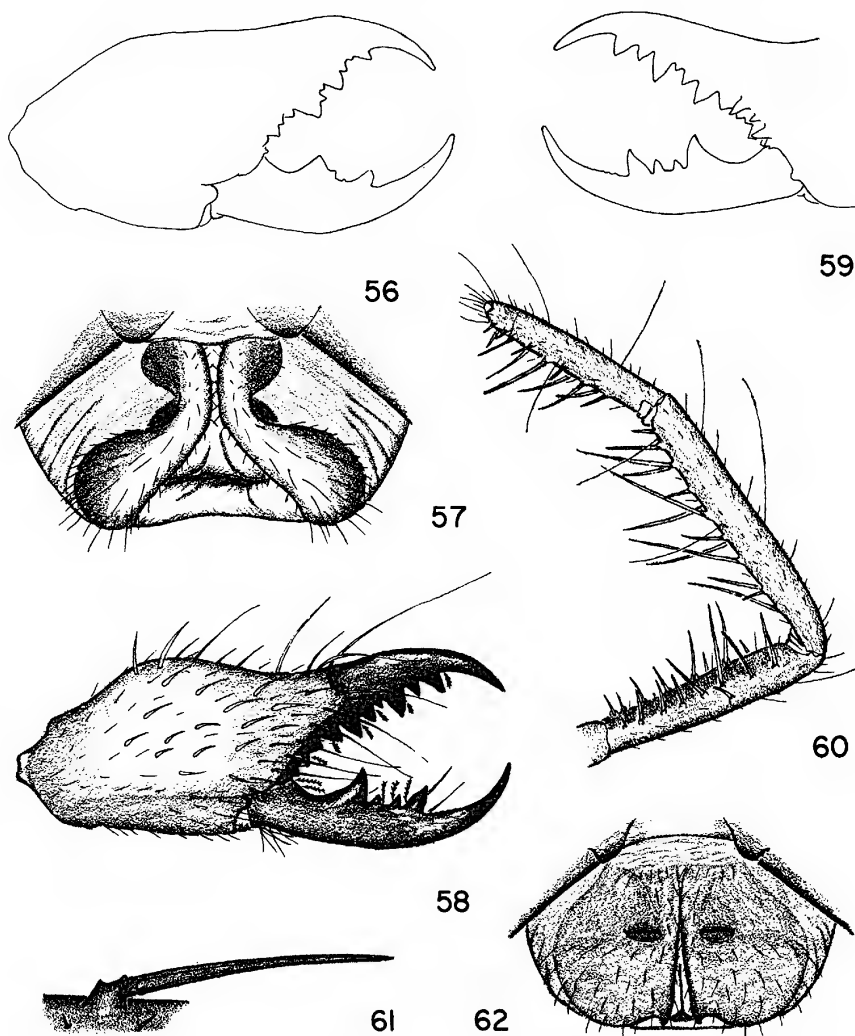
FEMALE HOLOTYPE: Body mangled, not measurable.

	LENGTH	WIDTH
Chelicerae	3.5 mm.	1.3 mm.
Propeltidium	1.7	2.4
Legs and palpi mangled, not measurable		

Color and markings in alcohol apparently the same as those of *H. milsteadii*.

Structure similar to that of *H. milsteadii* except that this species is somewhat larger, varies in cheliceral dentition (fig. 48), and has specifically different opercula (fig. 49).

TYPE LOCALITY: Female holotype from 60 miles southeast of Marathon, Texas, Brewster County (W. W. Milstead), in the American Museum of Natural History.



FIGS. 56, 57. *Eremobates nodularis* Muma. 56. Ectal view of right female chelicera. 57. Ventral view of female genital opercula.

FIGS. 58-62. *Horribates spinigerus*, new species. 58. Ectal view of right female chelicera. 59. Mesial view of right female chelicera. 60. Ectal view of right female palpus. 61. Structure of movable spines on female palpus. 62. Ventral view of female genital opercula.

Hemerotrecha elpasoensis, new species

Figures 74, 75

DIAGNOSIS: The opercula of this species are distinctive, and the fondal tooth formulas agree with those of *H. branchi* Muma. The species is tentatively placed in the *branchi* group of the genus, although other species of the group have two instead of four ctenidia and the opercula juvenile in appearance.

FEMALE HOLOTYPE: Total length, 16.0 mm.

	LENGTH	WIDTH
Chelicerae	3.8 mm.	1.5 mm.
Propeltidium	1.7	2.4
Palpus	12.0	—
First legs	9.5	—
Fourth legs	15.5	—

Color and markings in alcohol nearly the same as those of *H. branchi* Muma, except the dusky purple completely encircles the tarsi, metatarsi, and tibiae of the palpi, and all markings are more distinct.

Dentition (fig. 74) similar to that of *H. milsteadi*, except there are two intermediate teeth between principal and medial teeth of fixed finger, several denticles in front of anterior teeth of both fingers, and fondal teeth of both rows are graded in size I, III, II, IV.

Structure also similar to that of *H. milsteadi*, except there are four trace ctenidia on the first post-stigmatic abdominal sternite.

Opercula as in figure 75.

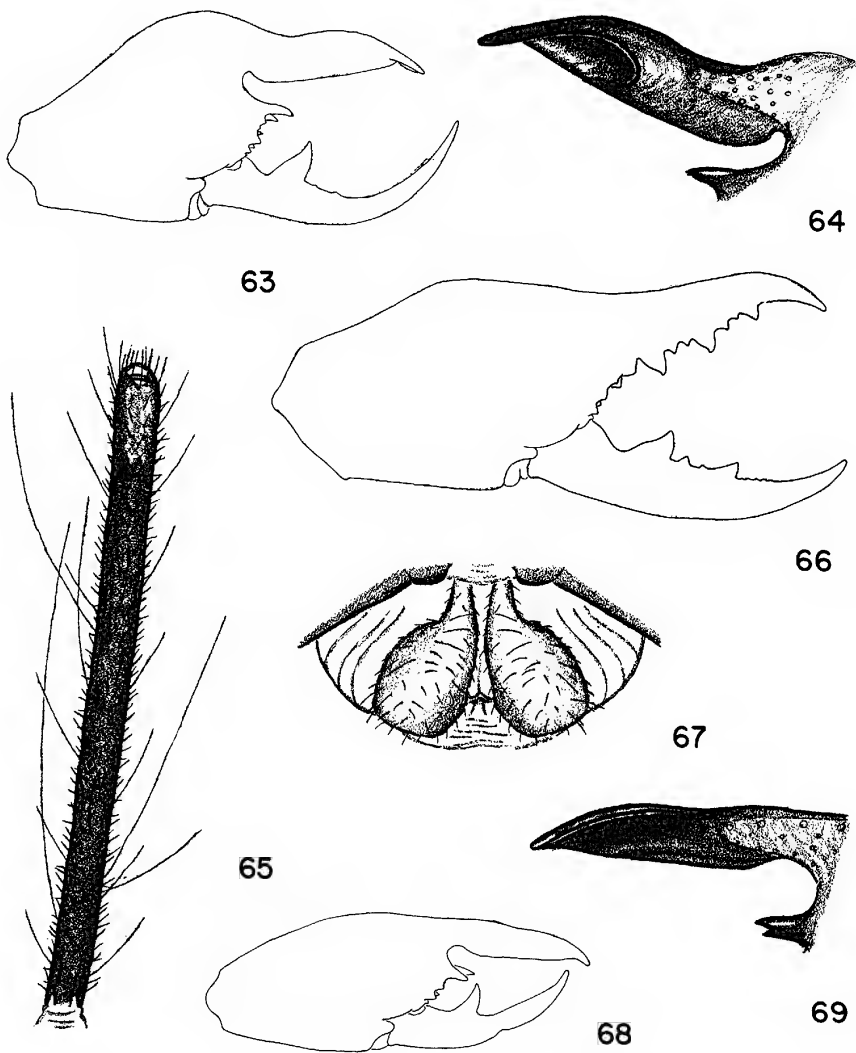
TYPE LOCALITY: Female holotype from a dry hillside near El Paso, El Paso County, Texas, on March 20, 1960 (Gertsch, Ivie, Schrammel).

FAMILY AMMOTRECHIDAE ROEWER
SUBFAMILY AMMOTRECHINAE ROEWER
GENUS *AMMOTRECU*LA ROEWER

The description of the males of *Ammotrechula pilosa* Muma and a new species requires the expansion of the key to males in Muma (1951, p. 130) to include five species.

KEY TO MALES

- 1. Fixed finger elongate and linear. Paired ventral spines present only on metatarsus of palpus. 4
- Fixed finger nearly normal. Paired ventral spines absent or present on both tibia and metatarsus of palpus. 2
- 2. Fixed finger constricted dorsally. Metatarsus and tibia of palpus each with



FIGS. 63-67. *Therobates plicatus*, new species. 63. Ectal view of right male chelicera. 64. Mesial view of fixed finger of right male chelicera. 65. Mesoventral view of right male palpus. 66. Ectal view of right female chelicera. 67. Ventral view of female genital opercula.

FIGS. 68, 69. *Therobates arcellus*, new species. 68. Ectal view of right male chelicera. 69. Mesial view of fixed finger of right male chelicera.

- eight pairs of ventral spines. *Ammotrechula peninsulana* (Banks)
 Fixed finger not constricted dorsally. Metatarsus and tibia of palpus each
 with fewer than eight pairs of ventral spines. 3
 3. Metatarsus and tibia of palpus each with seven pairs of ventral spines.
 *Ammotrechula venusta* Muma
 Metatarsus and tibia without distinguishable paired ventral spines.
 *Ammotrechula pilosa* Muma
 4. Metatarsus of palpus with four pairs of ventral spines.
 *Ammotrechula mulaiki* Muma
 Metatarsus of palpus with two pairs of ventral spines.
 *Ammotrechula wasbaueri*, new species

***Ammotrechula borregoensis*, new species**

Figures 50, 51

DIAGNOSIS: The distinctive markings and the possession of two rows of 10 or more unpaired cylindrical spines on the metatarsus and tibia of the palpus readily identify this species.

FEMALE HOLOTYPE: Total length, 15.0 mm. Chelicerae 1.0 mm. wide and 3.1 mm. long. Propeltidium 2.4 mm. wide and 1.9 mm. long.

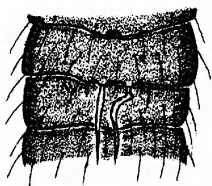
Color and markings in alcohol somewhat faded but apparently as follows: chelicerae light yellow; propeltidium pale, dusky, purplish brown except for a narrow, light yellow, median stripe, a small oval light area on each side of eye tubercle, a large, longitudinal, light, diamond-shaped area, two irregular median light areas near the posterior margin, and a light yellow posterior marginal band; mesopeltidium, metapeltidium, and abdominal tergites light except for narrow lateral and posterior dusky margins; all legs pale yellow except for first pair which are pale dusky purple on tarsi, metatarsi, tibiae, and femora; palpi dusky purple on tarsi, metatarsi, tibiae, and apical ends of femora; eye tubercle dark, malleoli white.

Dentition of chelicerae typical of the Ammotrechinae (fig. 50). Peak of dorsal carina occurring over first fondal tooth of ectal row.

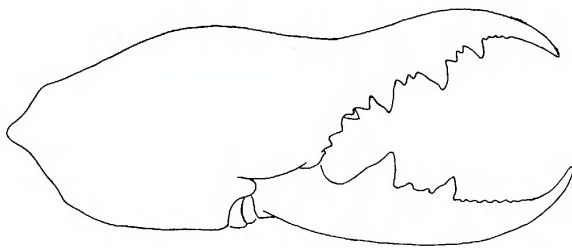
Palpi clothed with long and short hairs, scattered cylinder bristles on tarsi, metatarsi, and tibiae, and two rows of 10 or more short, unpaired, cylindrical spines on ventral surface of metatarsi and tibiae (fig. 51).

Chelicerae three times as long as wide. Propeltidium wider than long by a ratio of 1 to 1.2. Eyes slightly less than one diameter apart. Genital plate typical of family, wider than long by a ratio of 1 to 1.5.

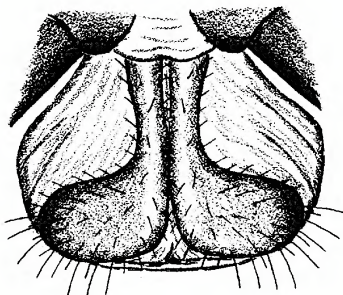
TYPE LOCALITY: Female holotype from Borrego State Park, San Diego County, California, April 28, 1955 (R. Schuster), in the American Museum of Natural History.



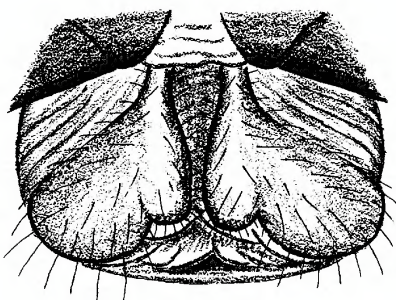
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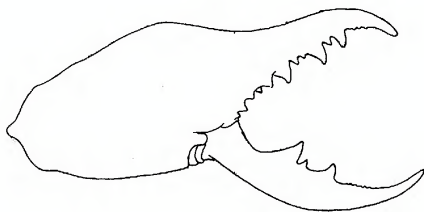
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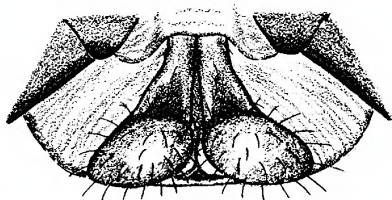


73



74

75



FIGS. 70, 71. *Therobates arcellus*, new species. 70. Male abdominal ctenidia. 71. Ventral view of female genital opercula.

FIGS. 72, 73. *Hemerotrecha serrata* Muma. 72. Ectal view of right female chelicera. 73. Ventral view of female genital opercula.

FIGS. 74, 75. *Hemerotrecha elpasoensis*, new species. 74. Ectal view of right female chelicera. 75. Ventral view of female genital opercula.

Ammotrechula pilosa Muma

Figures 52, 53

Ammotrechula pilosa MUMA, 1951, Bull. Amer. Mus. Nat. Hist., vol. 97, art. 2, p. 134, figs. 288–290 (female).

DIAGNOSIS: The female collected with the allotype and all the specimens recorded below are marked like the allotype, which indicates that the holotype was a faded specimen or that the species is variable in color.

A lack of serial spines on the palpus distinguishes this species.

MALES: Total length, 10.0 to 13.0 mm. Chelicerae 0.7 to 1.0 mm. wide and 2.6 to 3.2 mm. long. Propeltidium 1.7 to 2.1 mm. wide and 1.7 to 1.9 mm. long. Allotype smaller.

Color and markings in alcohol same as those of female holotype, but all legs and palpi dusky purple except on coxae and trochanters which are pale yellow; mesopeltidium, metapeltidium, and abdominal sclerites dusky purple, with marginal and submarginal pale stripes.

Dentition of the chelicerae as in figures 52 and 53. Fixed finger slender and elongate but bearing normal dentition. Intermediate tooth of movable finger closer to principal tooth than anterior tooth. Dental group of movable finger occupying about one-third of length of finger. Flagellum as in *A. penninsulana* but margins curled mesially to cover all of mesial surface except small area surrounding attachment disc.

Palpi clothed as in female.

Chelicerae slightly less than three times as wide as long. Propeltidium about as long as wide. Eyes separated by slightly less than one diameter.

TYPE LOCALITY: Female holotype from Texas in the collection of the University of Utah. Male allotype and female from Tucson, Arizona, July 5, 1954 (W. J. Gertsch), in the American Museum of Natural History.

RECORDS: California: Mt. Diablo, Contra Costa County, May 30, 1955, one male (J. G. and S. G. Rozen); Russelman Park, Mt. Diablo, Contra Costa County, May 14, 1955, one female (J. W. MacSwain).

***Ammotrechula wasbaueri*, new species**

Figures 54, 55

DIAGNOSIS: The cheliceral profile and possession of two paired and one unpaired cylindrical spines on the palpal metatarsus identify the species.

MALES: Total length, 8.0 to 11.0 mm. Chelicerae 0.6 to 0.9 mm. wide

and 2.1 to 2.7 mm. long. Propeltidium 0.7 to 1.6 mm. wide and 0.8 to 1.7 mm. long. Holotype larger.

Color and markings in alcohol pale yellow, with dusky purplish markings similar to those on *A. pilosa* except that legs and palpi pale on coxae, trochanters, and bases of femora; pale stripes on peltidia and abdominal sclerites not well defined.

Dentition somewhat atypical (fig. 54, 55). Fixed finger elongate and attenuated beyond reduced, spur-like, anterior and medial teeth. Intermediate tooth of movable finger minute. Dental group of movable finger occupying slightly more than one-third of length of finger. Flagellum spatulate, fringed at margins near distal end, curled mesially to cover most of mesial surface and attached to finger in front of first fondal tooth of mesial row.

Palpi with usual clothing of long and short hairs and scattered cylinder bristles on tarsi, metatarsi, and tibiae. Metatarsi also provided apically with one single and two pairs of strong, cylindrical spines.

Chelicerae nearly four times as wide as long. Propeltidium slightly longer than wide. Eyes separated by slightly more than one diameter.

TYPE LOCALITY: Male holotype from Andreas Canyon, Riverside County, California, April 24, 1954 (M. Wasbauer), in the collection of the American Museum of Natural History. Borrego, San Diego County, California, April 24, 1954, male paratype (J. G. Rozen). Imperial County, 13 miles north of Ogilby, June 7, 1958, male paratype (V. Roth).

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